

WHAT IS CLAIMED IS:

1. A combination of a drive power transmission device and a differential gear wherein said drive power transmission device for controlling the torque transmission from a propeller shaft to driven wheels through friction engagement of a clutch in a four-wheel drive vehicle is assembled bodily to said differential gear for said driven wheels, said combination comprising:

a bottomed, cylindrical housing of said drive power transmission device, said front housing having a clutch receiving chamber therein and connected to said propeller shaft;

a gear shaft provided at one shaft end thereof with a drive gear for said differential gear and received at the other shaft end portion thereof in said housing;

said clutch received in said clutch receiving chamber and including a plurality of outer clutch plates engaged with the internal surface of said clutch receiving chamber to be rotatable bodily with said housing but axially movable relative thereto and a plurality of inner clutch plates engaged with an engaging portion formed on said gear shaft to be bodily rotatable with said gear shaft but axially movable relative thereto, said out clutch plates being arranged in an alternate fashion with respect to said inner clutch plates; and

a clutch operating device for bringing said outer and inner clutch plates selectively into and out of friction engagement.

2. A combination of a drive power transmission device and a differential gear wherein said drive power transmission device for controlling the torque transmission from a propeller shaft to driven wheels through friction engagement of a main clutch in a four-wheel drive vehicle is assembled bodily to said differential gear for said driven wheels, said combination comprising:

a differential case constituting a part of said differential gear;

a gear shaft supported in said differential case rotatably on a rotational axis and provided at one shaft end portion thereof with a drive gear for said differential gear, said

gear shaft having the other shaft end portion thereof protruding from an opening end portion of said differential case;

a partition wall portion formed on said differential case and extending from said opening end portion of said differential case in a direction perpendicular to said rotational axis;

a clutch case forming a housing chamber together with said partition wall portion, said clutch case being put on, and secured to, the circumferential edge portion of said partition wall portion;

a bottomed, cylindrical front housing of said drive power transmission device, said front housing having a clutch receiving chamber therein and supported on said clutch case inside said housing chamber to be rotatable on said rotational axis, said front housing being connected to said propeller shaft;

said main clutch received in said clutch receiving chamber and including a plurality of outer main clutch plates engaged with the internal surface of said clutch receiving chamber to be rotatable bodily with said front housing but axially movable relative thereto and a plurality of inner main clutch plates engaged with an engaging portion formed on said gear shaft to be rotatable bodily with said gear shaft but axially movable relative thereto, said outer main clutch plates and said inner main clutch plates being arranged in an alternate fashion with each other;

a rear housing composed of a large-diameter rear housing portion secured to an opening end portion of said front housing, a small-diameter rear housing portion rotatably supported on said shaft end portion of said gear shaft, and an annular intermediate portion made of a non-magnetic material bodily joined at outer and internal surfaces thereof respectively with said large-diameter rear housing portion and said small-diameter rear housing portion;

an armature arranged in said clutch receiving chamber to be rotatable bodily with said front housing but axially movable relative thereto;

a pilot clutch arranged between said rear housing and said armature in said

clutch receiving chamber to be pressured by said armature upon said rear housing and including at least one outer pilot clutch plate bodily rotatable with said front housing but axially movable relative thereto and at least one inner pilot clutch plate axially movable relative to said front housing;

a yoke secured to said differential case between said large-diameter rear housing portion and said small-diameter rear housing portion;

an electromagnet held by said yoke for attracting said armature thereby to pressure said outer and inner pilot clutch plates on said rear housing; and

a cam-type amplifying mechanism arranged between said main clutch and said rear housing and composed of a first cam member rotatable bodily with said at least one inner pilot clutch plate on said shaft end portion of said gear shaft, a second cam member rotatable bodily with said gear shaft but axially movable relative thereto, and cam followers arranged between the first and second cam members for pressuring said second cam member on said main clutch when the friction engagement in said pilot clutch causes the first cam member to rotate relative to the second cam member thereby to pressure the same upon said main clutch.

3. A method of manufacturing the combination which is constituted as set forth in Claim 1, said method comprising the steps of:

forming a reference bore at the bottom surface of said housing coaxially of said rotational axis;

providing an assembling tool having at one end thereof a fitting portion adapted to be inserted into said reference bore and an engaging portion with which said inner clutch plates are engageable to be bodily rotatable but axially movable relative thereto;

inserting said assembling tool at said fitting portion into said reference bore of said housing with the axis of said assembling tool extending coaxially of said rotational axis;

inserting said outer clutch plates and said inner clutch plates successively into said clutch receiving chamber while engaging said outer clutch plates with the internal

surface of said clutch receiving chamber and while engaging said inner clutch plates with said engaging portion of said assembling tool;

removing said assembling tool from said housing with said outer and inner clutch plates being received in said housing and being preliminarily pressured on each other; and

inserting said gear shaft protruding from said differential gear into the space from which said assembling tool has been removed, while making said inner clutch plates engaged with said engaging portion of said gear shaft so that said inner clutch plates are bodily rotatable with said gear shaft but axially movable relative thereto.

4. A method of manufacturing the combination which is constituted as set forth in Claim 2, said method comprising the steps of:

forming a reference bore at the bottom surface of said front housing coaxially of said rotational axis;

providing an assembling tool having at one end thereof a fitting portion adapted to be inserted into said reference bore and an engaging portion with which said inner main clutch plates are engageable to be bodily rotatable but axially movable relative thereto;

inserting said assembling tool at said fitting portion into said reference bore of said front housing with the axis of said assembling tool extending coaxially of said rotational axis;

inserting said outer main clutch plates and said inner main clutch plates successively in said clutch receiving chamber while engaging said outer main clutch plates with the internal surface of said clutch receiving chamber and while engaging said inner main clutch plates with said engaging portion of said assembling tool;

arranging said clutch operating device on said main clutch;

securing said rear housing to said front housing while preliminarily pressuring said main clutch upon said front housing;

removing said assembling tool after securing said rear housing to said front

housing; and

inserting said gear shaft protruding from said differential gear into the space from which said assembling tool has been removed, while making said inner main clutch plates engaged with said engaging portion of said gear shaft so that said inner main clutch plates are bodily rotatable with said gear shaft but axially movable relative thereto.